

## **REMARKS**

Claims 1-5, 7, 9-13, 15, 17-18 and 20 are now pending in the application. Claims 1-5, 7, 9-13, 17 and 20 are amended. Claims 6, 8, 14, 16 and 19 were cancelled in a prior amendment.

### **1. REJECTIONS UNDER 35 U.S.C. § 112**

Claims 4 and 5 stand rejected under 35 U.S.C. § 112 first paragraph, as failing to comply with the enablement requirement.

Independent claim 1 is currently amended to more clearly present the claimed features. In particular, claim 1 now recites:

a coolant flow path configured to pass coolant through the fuel cell to cool the fuel cell, the coolant flow path comprising a coolant reservoir;  
a first enclosure encompassing at least a part of the coolant flow path;  
a first passive hydrogen vent configured to vent hydrogen from the first enclosure without reliance upon any electrical device and configured to maintain the hydrogen concentration within the first enclosure below about 4 percent;

The claim is supported, for example, by the disclosure: "The coolant flow path is defined by the enclosure created by, e.g., the flow channels in the fuel cell stack 60, the coolant reservoir 72 and the lines 50, 52, 64, 68, 70 and 76. Thus, the hydrogen vent 88 may be placed within a wall of any of these enclosure components of the coolant flow path." Specification paragraph [0019] on pages 7-8.

Dependent claim 4 is amended to further define the first enclosure of claim 1 as comprising the coolant reservoir and the first passive hydrogen vent as located within a wall of the coolant reservoir. For example, the coolant flow reservoir 72 can have a hydrogen vent 88 as shown in Figure 2; and see paragraph [0019] on pages 7-8 of the

original specification. Features of dependent claim 5 are illustrated in paragraph [0020] on page 8. As amended, the features of claims 4 and 5, including the features set out in base claim 1, are fully supported and enabled by the specification and drawings.

Claims 12-15 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

In a similar fashion, independent claim 11 is currently amended to more clearly present the claimed features. Dependent claim 12 further defines the first enclosure as comprising the coolant reservoir and the first passive hydrogen vent as being located within a wall of the coolant reservoir. These features are fully supported and enabled by the specification and drawings in the same passages and drawings as are the corresponding features in claim 1.

Accordingly, Applicants respectfully request reconsideration of the claims and withdrawal of the rejections.

## **2. REJECTION UNDER 35 U.S.C. § 103 – WALSH & EDLUND**

Claims 1, 2, 4, 7, 9, 11, 12, 16 & 20 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Walsh (U.S. Pub. No. 2003/0118881) in view of Edlund (U.S. Pub. No. 2002/0114984). This rejection is respectfully traversed.

Independent claims 1 and 11 are not obvious in view of Walsh and Edlund as the claims include features not found in the reference combination. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (combined references must teach or suggest all the claim limitations to establish a *prima facie* case of obviousness). In particular, the references do not teach or suggest a passive hydrogen vent or,

consequently, a first enclosure encompassing at least a part of a coolant flow path and having a first passive hydrogen vent, along with a second enclosure encompassing at least a part of the hydrogen flow path and having a second hydrogen vent. Moreover, there is no apparent reason or basis provided by the combined teachings or the general knowledge in the art for a skilled artisan to modify the teachings to include the missing subject matter, as required by *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1740-41, 82 USPQ2d 1385, 1396 (2007) (obviousness includes determining whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue). Thus, the Walsh and Edlund combination cannot form a case of obviousness.

Independent claims 1 and 11 both provide first and second enclosures, each enclosure having a passive hydrogen vent. The first enclosure encompasses a part of the coolant flow path and the second enclosure encompasses a part of the hydrogen flow path. See specification paragraphs [0019]-[0023] on pages 7-9; and Figure 2. The vent on the first enclosure is a passive hydrogen vent and does not require any electrical or other active components to function. Paragraphs [0020]-[0021] on page 8. A bipolar plate assembly of a fuel cell stack may have an internal coolant flow field provided between the metal plates. Paragraph [0005] on page 2, lines 20-23. Hydrogen may migrate into the coolant flow field in the fuel cell and accumulate within the cooling system and in other enclosures. Paragraphs [0006]-[0007] on page 2, lines 1-8 and 12-15. The present claims vent accumulated hydrogen from these fuel cell enclosures. Paragraph [0007] on page 2, lines 14-15.

The primary reference of Walsh provides a vent 114 in a water tank 102. Walsh page 3, paragraph [0032]; and Figures 1-3. However, Walsh has several flaws. First,

Walsh teaches that condensate in the anode feed 342 and the anode exhaust 344, which may contain combustible gases (i.e., hydrogen), may be dealt with in two different ways. One way is to include water traps, such as 348 and 352, on drain lines to send water to the water tank 302 and thereby limit exposure of the water tank to such hydrogen-containing streams. Walsh page 4, paragraph [0037]; and Figure 3. Another way is by continually purging the atmosphere of the water tank with an air stream to prevent buildup of combustible gases, obviating the need for the water traps. Walsh page 4, paragraph [0037]. Continually purging the atmosphere of the water tank with an air stream is actively forcing gas out through the vent, meaning the Walsh vent is not a passive vent.

Second, Walsh's water tank is not holding coolant, it is holding condensate. The water tank 102 is not a coolant reservoir and is not even part of a coolant flow path. Instead, the Walsh teachings are directed toward removing condensate from a process stream in a fuel cell system. Walsh page 1, paragraph [0008]. For example, condensate can interfere with flow of process streams and can build to levels that can flood portions of the system, and can cause problems if allowed to freeze. Walsh page 1, paragraph [0008].

Third, the Walsh water tank has the cathode gas stream ( $O_2$ ) fed into it, not the anode gas stream ( $H_2$ ). Walsh page 3, paragraph [0032]; and see Figures 1-3. For example, the cathode inlet conduit 104 and outlet gas conduit 106 are connected to the water tank 102; note also that the water tank 102 is separate from the fuel cell stack 100. The vent 114 allows gas to exit as it circulates through the tank 102. Thus, the cathode streams provided to the water tank 102 in Walsh do not even contain hydrogen.

The Edlund reference provides a housing 140 that encompasses a fuel cell system. Edlund pages 7-8, paragraph [0062]; Figure 11. Edlund does not teach a vent in the housing 140 and is silent regarding the buildup of hydrogen. In fact, only the present application appreciates the improvement of venting hydrogen that may leak from various pipes and fittings of the hydrogen flow path, including the hydrogen supply, where the present claims enable the venting of accumulated hydrogen from these other enclosures of a fuel cell. Present specification paragraph [0007] on page 3, lines 11-16. There is no teaching or suggestion regarding such hydrogen leaks found in either Edlund or Walsh. See *ATD Corporation v. Lydall, Inc.*, 159 F.3d 534, 48 USPQ2d 1321, 1329 (Fed. Cir. 1998) (obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention).

The combination of Walsh and Edlund therefore cannot establish a case of obviousness based on the deficiencies illustrated above. First, no passive hydrogen vent is provided by the combined disclosures. Second, the purpose of the water tank in Walsh (with its associated vent) is directed to collection of condensate and is not part of a coolant system. Third, the references fail to provide venting of hydrogen from a second enclosure. What is more, there is no reason or basis for a skilled artisan to modify and adapt the Walsh water tank to a coolant system and/or coolant reservoir. It is not clear how such modifications could even be made or how such modifications would interact with the streams from the cathode inlet and outlet conduits. And it is unclear whether such a modified system would even be operable. Consequently, a skilled artisan would not have a reasonable expectation of successfully adapting the

Walsh and Edlund teachings and further include part of a coolant flow path and a passive hydrogen vent within the water tank and further provide a vent in the Edlund housing.

Applicants respectfully request reconsideration of the claims and withdrawal of the rejection.

### **3. REJECTION UNDER 35 U.S.C. § 103 – WALSH, EDLUND, & NODA**

Claims 1, 2, 4, 7, 9, 11, 12, 16 & 20 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Walsh (U.S. Pub. No. 2003/0118881) in view of Edlund (U.S. Pub. No. 2002/0114984) and Noda (U.S. Pat. No. 5,623,390). This rejection is respectfully traversed.

The teachings and shortcomings of the Walsh and Edlund references are illustrated in the preceding section.

Noda is provided for teaching that hydrogen gas should be vented from a computer having a nickel-hydrogen battery so that it does not reach the explosive concentration of 4%. Noda col. 9, lines 7-27. Even so, Noda does not relate this problem to fuel cells, nor does Noda solve a problem of accumulation of H<sub>2</sub> in a coolant system or coolant reservoir, nor does Noda provide any guidance regarding the configuration of vents and enclosures within fuel cells and cooling systems. Catastrophic battery failure is an entirely different problem than the issues addressed by the present claims.

There is no reason or basis for a skilled artisan to modify and adapt the Walsh water tank (directed only to collection of condensate) to a coolant system and/or coolant

reservoir and it is not clear how such modifications could even be made or how they would interact with the streams from the cathode inlet and outlet conduits, or whether they would even be operable. There is also no teaching or suggestion for providing a vent in the Edlund housing; only the only the present application appreciates that leakage of hydrogen from pipes and fittings of the hydrogen flow path and buildup in one or more enclosures. Consequently, there is no way a skilled artisan, based on the collective teachings of these four references, would modify the Walsh and Edlund systems, further include part of a coolant flow path and a passive hydrogen vent capable of keeping hydrogen below 4% (as per Noda) within the water tank, and further provide another vent in the Edlund housing.

As such, Noda cannot cure the deficiencies of Walsh and Edlund and the present claims are therefore not obvious over the combined references. Applicants respectfully request reconsideration of the claims and withdrawal of the rejection.

#### **4. REJECTION UNDER 35 U.S.C. § 103 – WALSH, EDLUND, NODA, & BUZZELLI**

Claims 10 & 17 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Walsh (U.S. Pub. No. 2003/0118881) in view of Edlund (U.S. Pub. No. 2002/0114984) and Noda (U.S. Pat. No. 5,623,390) as applied to claims 1 & 16 respectively and further in view of Buzzelli (U.S. Pat. No. 4,168,349). This rejection is respectfully traversed.

The teachings and shortcomings of the combination of Walsh, Edlund, and Noda are illustrated in the preceding sections.

Buzzelli is provided for teaching an iron/air battery cell having a sintered ceramic vent that acts as a flame and explosion barrier. Buzzelli col. 2, lines 55-60. However, the Buzzelli reference fails to provide the teachings and/or suggestions necessary to overcome the deficiencies of Walsh, Edlund, and Noda as illustrated in the preceding sections.

Briefly, the water tank in Walsh (with its associated vent) is for collection of condensate and is not part of a coolant system. There is no reason or basis for a skilled artisan to modify and adapt the Walsh water tank to a coolant system and/or coolant reservoir and it is not clear how such modifications could even be made or how they would interact with the streams from the cathode inlet and outlet conduits. It is unclear whether such a modified system would even be operable. There is also no reason provided as to why a skilled artisan would modify the Edlund housing to include a vent; only the only the present application appreciates that hydrogen may leak from various pipes and fittings of the hydrogen flow path, including the hydrogen supply, and accumulate in one or more enclosures. Thus, there is no way that a skilled artisan, based on the collective teachings of these four references, would modify the Walsh and Edlund systems, further include part of a coolant flow path and a passive hydrogen vent that acts as a flame and explosion barrier (as per Buzzelli) within the water tank, and further provide a vent in the Edlund housing.

The present claims are hence not obvious over the cited combination and Applicants respectfully request reconsideration of the claims and withdrawal of the rejection.



## **5. REJECTION UNDER 35 U.S.C. § 103 – WALSH, EDLUND, NODA, & GENC**

Claims 3, 5 & 13-15 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Walsh (U.S. Pub. No. 2003/0118881) in view of Edlund (U.S. Pub. No. 2002/0114984) and Noda (U.S. Pat. No. 5,623,390) as applied to claims 1, 2, 4 & 12 respectively and further in view of Genc (U.S. Pub. No. 2002/0160245). This rejection is respectfully traversed.

The teachings and shortcomings of the combination of Walsh, Edlund, and Noda are illustrated in the preceding sections.

Genc is provided for disclosing a release valve 30 having a membrane 40 operable to permit passage of gas and inhibit passage of liquid at a first pressure. Genc paragraphs [0019]-[0020] on pages 1-2; and Figure 2. The membrane may be constructed of various polymers. Genc paragraph [0021] on page 2.

However, “modify[ing] the vent of Walsh with the selectively permeable membrane taught by Genc to improve the efficiency and safety of the fuel cell system by keeping the wanted substances and allowing the unwanted substances to pass” fails to account for the deficiencies of the Walsh, Edlund, and Noda combination. Page 8, lines 10-13 of the Office Action dated December 11, 2008. In particular, there is no way a skilled artisan, based on the collective teachings of these four references, would modify the Walsh and Edlund systems, further include part of a coolant flow path and a passive hydrogen vent having a selective membrane (as per Genc) within the water tank, and further provide a vent in the Edlund housing.

Accordingly, Applicants respectfully request reconsideration of the claims and withdrawal of the rejection.

**6. REJECTION UNDER 35 U.S.C. § 103 – WALSH, EDLUND, NODA, BUZZELLI, & GENC**

Claims 18 stands rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Walsh (U.S. Pub. No. 2003/0118881) in view of Edlund (U.S. Pub. No. 2002/0114984) and Noda (U.S. Pat. No. 5,623,390) and Buzzelli (U.S. Pat. No. 4,168,349) as applied to claim 17 and further in view of Genc (U.S. Pub. No. 2002/0160245). This rejection is respectfully traversed.

The teachings and shortcomings of the combination of Walsh, Edlund, and Noda and Buzzelli and the combination of Walsh, Edlund, Noda, and Genc are illustrated in the preceding sections. Thus, dependent claim 18 is nonobvious over the reference combination for the same reasons that independent claim 11 is nonobvious. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) (if an independent claim is nonobvious then any claim depending therefrom is nonobvious).

Applicants respectfully request reconsideration of the claim and withdrawal of the rejection.

## 7. CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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